

What is claimed is:

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1. A method of processing a substrate,  
comprising the steps of:

providing hydrogen radicals to a surface of  
the substrate;

10 providing fluorine radicals to the surface  
of the substrate; and

processing the surface of the substrate with  
the hydrogen radicals and the fluorine radicals.

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2. The method as claimed in claim 1, wherein  
the hydrogen radicals are generated in a step of exciting  
20 hydrogen gas with high frequency plasma.

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3. The method as claimed in claim 2, wherein  
the hydrogen radicals are generated outside a processing  
space in which the substrate is retained, and are  
transported to the processing space.

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4. The method as claimed in claim 1, wherein

the fluorine radicals are generated in a step of exciting fluorine gas with ultra violet rays.

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5. The method as claimed in claim 4, wherein the fluorine radicals are generated in a processing space in which the substrate is retained.

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6. The method as claimed in claim 1, wherein  
15 the step of providing the hydrogen radicals and the step of providing the fluorine radicals are performed simultaneously.

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7. The method as claimed in claim 6, wherein the step of providing the fluorine radicals is begun after the step of providing the hydrogen radicals is begun.

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8. The method as claimed in claim 7, wherein  
30 the step of providing the hydrogen radicals is terminated after the step of providing the fluorine radicals is terminated.

9. The method as claimed in claim 1, further comprising the step of providing water vapor to the surface of the substrate.

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10. The method as claimed in claim 1, further comprising the step of:

10 providing water vapor to the surface of the substrate;

wherein

15 the step of providing the hydrogen radicals and the step of providing the fluorine radicals are performed simultaneously; and

the step of providing hydrogen radicals and fluorine radicals and the step of providing water vapor are alternatively and repeatedly performed.

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11. The method as claimed in claim 10, wherein the processing space in which the substrate is retained is purged with inert gas after the step of providing water vapor and before the step of providing hydrogen radicals and fluorine radicals.

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12. An apparatus for processing a substrate, comprising:

a processing vessel that is vacuated at a first end, said processing vessel provided with a mount on which the substrate is retained,

5       a remote plasma source provided at a second end of said processing vessel;

          a processing gas port provided at the second end of said processing vessel;

10      a ultra violet light source formed between said processing gas port and the substrate, said ultra violet light source provided on said processing vessel;

          a hydrogen providing line connected to said remote plasma source; and

          a fluorine providing line connected to said processing gas port.

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          13. The apparatus as claimed in claim 12,  
20    wherein the mount has a mechanism for rotating the substrate.

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          14. The apparatus as claimed in claim 12,  
wherein a water vapor providing line is provided to the second end of said processing vessel.

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